WHAT IS A CAVE?

Objectives:

Students will be introduced to different caves and karst areas of the United States.

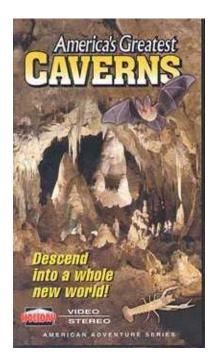
Materials:

• A copy of America's Greatest Caverns

America's Greatest Caverns

This is a 60-minute video covering a wide range of cave topics. The film has excellent footage of the more common cave formations found in North America, as well as several of the more rare formations.

The video starts by discussing the origin of caves. It explains how water combines with carbon dioxide to form carbonic acid, which dissolves limestone caves. It quickly discusses the origin of less common caves such as lava tubes, sandstone caves, sea caves, and ice caves.



The relationships between groundwater flow and cave formation are discussed along with a discussion of speleothems (formations) and the processes under which they form. The processes are discussed rather quickly, and students may not easily understand them, but the names of the formations are told well. Following this is a 3-minute segment on nicknames people have given cave formations that is amusing, but rather uneducational.

The uses of minerals found in caves are discussed with an interesting segment on the history of the mining of saltpeter (which is made into gunpowder), and how it was used during the War of 1812 and the Civil War. Further discussion leads to several other uses of caves, such as Civil War hospitals, hideouts for notorious outlaws like Jesse James, and attempted Tuberculosis clinics.

Water pollution and its impact on caves are examined using the example of Hidden River Cave. Hidden River Cave was shut down because of pollution for 50 years until the caving community cleaned and restored it. The video shows how scientists can track how pollution may flow into caves by using non-toxic, biodegradable dye tracing.

Students will see parts of the more popular show caves in the United States, including: Luray Cave, Wind Cave, Jewel Cave, Lost Sea Cave, Ruby Falls Cave, Mammoth Cave, Carlsbad Caverns, and Crystal Cave (Near Sequoia National Park). Intertwined within the footage are sections on the formation of Karst (limestone) regions, and cave wildlife. Just before the conclusion of the video is a small section on cave conservation.

Topics for discussion

When showing this video to students, discuss the following topics.

- Discuss the processes of the formation of speleothems to make sure it is understood. Emphasize the process of water dripping, flowing, and seeping, while leaving calcite behind through degassing and evaporation. The basic process of the formation of stalactites and stalagmites happens when water traveling from the surface picks up carbon dioxide from the plants and/or soil. This causes the water to become acidic or carbonic acid. This acid has the power to dissolve limestone (calcite is the basis of limestone) and carry it in solution. When the carbonic acid (water) enters an air filled chamber (cave), the carbon dioxide degasses (leaves) from the water (the carbon dioxide goes back into the air). This results in the pH level of the water changing. The water can no longer hold the limestone (calcite) in solution. So it leaves small particles (crystals) of it on the wall of the cave. If the water is dripping it will create a stalactite. If the water doesn't lose the carbon dioxide until it hits the floor of the cave, it will create a stalagmite. Most other speleothems are formed in some variation of this process. For more information about how speleothems form, explore Carol Hill's book *Cave Minerals of the World*.
- Discuss the impact on caves caused by various uses (i.e. mining cave minerals, health care, public tours, etc.). How could these impacts be avoided?
- The draperies seen on the Luray Cave "Organ" were filed down to make the various notes. How might this affect the formations?
- Discuss the section showing the conflict between the above ground cray fish and the blind cave cray fish. While the video showed the advantages the above ground cray fish had in size and vision, would it be able to survive as well as the blind cave cray fish in a cave environment